THAT WHICH IS CLAIMED IS:

1. A process of fabrication of a pressure sensor comprising the steps of forming a buried layer of a second type of conductivity (Si_P+) in a monocrystalline silicon substrate (Si_N-) of a first type of conductivity upon growing an epitaxial layer (N_Si) of said first type of conductivity, depositing a sacrificial oxide layer on said epitaxial layer (N_Si) in the area of said sensor, depositing a polysilicon layer of backplate provided with a plurality of holes over said sacrificial oxide layer isotropically etching said sacrificial oxide layer through said holes as far as removing the oxide in the sensor area and forming a microphone cavity under said epitaxial layer in the sensor area, characterized in that before depositing said sacrifical oxide layer the method comprises the steps of:

defining by masking and cutting a plurality of trenches or holes uniformly spaced from one another by anisotropic plasma etching the monocrystalline silicon either from the front side or through the rear side for a depth sufficient to reach through at least a portion of the thickness of said doped buried layer over the area of the sensor;

electrochemically etching the doped silicon (Si_P+) of said buried layer through said trenches using an electrolytic solution adapted for selectively dissolving the doped silicon of said opposite kind of conductivity, making the porous the silicon of said buried layer;

sealing said trenches or holes by depositing a layer of sealant material;

and after having deposited said polysilicon layer of backplate and removed said sacrifical oxide the method comprises the steps of

selectively etching said sealant material

reopening said trenches or holes;

oxidizing the porous silicon of said buried layer and chemically etching the oxidized silicon with an acid solution through the reopened trenches or holes realizing said microphone cavity underneath the epitaxial layer.

2. The process according to claim 1, wherein said acid solution is a diluted solution of hydrofluoric acid and the etching is carried out at room temperature.

3. The process according to claim 1, wherein said sealing material and said sacrifical oxide is silicon oxide deposited by a PVAPOX technique.

4. The process according to claim 1, wherein said cavity and overhanging diaphragm are shaped as concentric circular sectors.

5. The process according to claim 1, wherein said of oxidation step is carried out immediately after the electrochemical etching of the silicon of the buried layer.

6. A pressure sensor defined on a monocrystalline silicon substrate and including a microphone cavity a monocrystalline silicon diaphragm closing said cavity and a polycrystalline silicon backplate layer, spaced from said monocrystalline silicon diaphragm and having a plurality of holes overhanging on said diaphragm, characterized in that said pressure sensor is in monolithic form.

7. The pressure sensor of claim 6, wherein said backplate layer is composed of a first polycrystalline silicon layer with a doping of the same

type of conductivity of the substrate and of said epitaxial layer, topped by a second layer of undoped polycrystalline silicon.

8. A monolithically integrated system for detecting the direction of provenance of a sound wave comprising

a plurality of pressure sensors according to anyone of claims 6 and 7, disposed according to a certain layout on the chip and producing respective analog signals;

as many analog/digital converters of the signals produced by the respective sensors, generating respectively corresponding digital signals;

calculating means performing a time-delay correlation between the digital signal produced by a first sensor and the digital signal of another sensor generating a value of delay for which the correlation is maximum;

a microprocessor calculating the direction of provenance of the sound wave as sensed by the pressure sensors in function of said and of said delay values.